

Thematic work – AGRO researcher days 2022

Low carbon footprint farming

Agricultural production systems have large pressures on land, water, and climate. Reduction of greenhouse gas emissions, the carbon uptake in soil and vegetation, and the consumption of resources are crucial to achieving the goals of limiting climatic change. This requires development of new technologies, management systems, and new food and biomass systems that apply circular concepts. It links to the need for adapting to climatic changes, including increased climatic variation and extremes.

Pesticide free farming

Many chemical pesticides are no longer marketed in the EU, and it is expected that more chemical pesticides will be banned in the future; this increases the demand for alternative control methods and strategies. At the same time there are increasing problems with resistance to the chemical pesticides. This requires developing and documenting alternative methods and strategies to ensure efficient plant protection without a decrease in yield or problems with development of pesticide resistance.

Low nutrient emission farming

Agriculture will be met with increasing demands for reduced emissions of nitrogen and phosphorus to the aquatic environment and to the groundwater to an extent which may limit the agricultural land use. This requires developing documented alternative farming systems and new technologies for reducing nitrogen and phosphorus emission at field, catchment, and landscape levels. It also requires developing new methods for targeting and incentivizing measures.

Maintaining and improving soil quality

Cultivated soil are under threat due to loss of organic matter and biodiversity, erosion, compaction, and pollution. Research into soil functions and management practices combined with geographical and functional characterisation of soil in the landscape is of crucial importance to the protection of soil functions and ecosystem services. It also requires better understanding of how sustainable soil management is implemented in practice and how it is incentivized.

Sustainable digital-based farming

The technological development within sensors and data processing with increasing use of AI technologies offers new possibilities of monitoring and controlling production systems. This entails automation of production processes through use of robotic technologies. This requires development and design of new sustainable crop and farming systems, including development of new genotypes of crops with specific characteristics.

Farming for biodiversity

Biodiversity in plants and soils across the agricultural landscape is key to the functioning of agricultural systems and to the delivery of ecosystem services. Farmed crops interact with organisms in natural ecosystems and depend on them for their functions. Dependencies include soil fertility, the reduction of pests by their natural enemies and the pollination of plants by insects. Research should explore how biodiversity can be enhanced for the benefit of agricultural and food production.

Plant-based food

The current animal-based food systems exert large pressures on land use, while plant-based food systems are still underdeveloped. There is a great need to explore how current and new food crops can be grown and processed to viably sustain healthy diets with low environmental and climate impacts. This requires exploration of pesticide free cropping systems with high quality and high yielding productions.